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**PAT-NO:** JP361235493A  
**DOCUMENT-IDENTIFIER:** JP 61235493 A  
**TITLE:** SLAG DISCHARGING APPARATUS FOR GASIFYING OVEN  
**PUBN-DATE:** October 20, 1986

**INVENTOR-INFORMATION:**

NAME	COUNTRY
HANEDA, TOSHIO	
KASHIWAZAKI, MASAMICHI	
KOGA, YOSHITAKA	

**ASSIGNEE-INFORMATION:**

NAME	COUNTRY
MITSUBISHI HEAVY INDN/A LTD	

**APPL-NO:** JP60075353  
**APPL-DATE:** April 11, 1985

**INT-CL (IPC):** C10J003/46

**US-CL-CURRENT:** 48/87

**ABSTRACT:**

PURPOSE: To provide the title apparatus capable of stably and continuously discharging a slag without affecting operating conditions of a gasifying oven and gasifying performance, by incorporating a heater in a molten slag discharging portion in a spouted bed coal gasifying oven.

CONSTITUTION: A spouted bed coal gasifying oven in which a coal and a gasifying agent are fed into a gasifying oven 1 to form a gas by gasification while an ash produced is molten in a high-temp. atmosphere to form a molten slag 5 which is in turn discharged into the outside of the furnace 1, characterized in that the furnace 1 is equipped with a slag hole 12 at the bottom thereof the outer side of which is surrounded by a water-cooled wall 2 branched from the end of a water-cooled wall inlet tube 15 and to which a fireproofing material 11 and a refractory and thermal insulating material 13 are applied and that a heater 14 is incorporated in the refractory and thermal insulating material 13. The above slag discharging apparatus can prevent the slag from being cooled and solidified without affecting operating conditions of the gasifying oven 1 and gasification performance.

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☐ 1. Document ID: JP 61235493 A

L1: Entry 1 of 2

File: JPAB

Oct 20, 1986

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Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KMC
Draw	Desc	Image									

☐ 2. Document ID: JP 61235493 A

L1: Entry 2 of 2

File: DWPI

Oct 20, 1986

DERWENT-ACC-NO: 1986-316305  
DERWENT-WEEK: 198648  
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TITLE: Slag drainer for coal gasifier furnace - includes heater incorporated in molten slag drain zone in furnace

## PATENT-ASSIGNEE:

ASSIGNEE

MITSUBISHI HEAVY IND CO LTD

CODE

MITO

PRIORITY-DATA: 1985JP-0075353 (April 11, 1985)

## PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
<u>JP 61235493 A</u>	October 20, 1986		003	

## APPLICATION-DATA:

PUB-NO	APPL-DATE	APPL-NO	DESCRIPTOR
JP61235493A	April 11, 1985	1985JP-0075353	

INT-CL (IPC): C10J 3/46

ABSTRACTED-PUB-NO: JP61235493A  
BASIC-ABSTRACT:

Slag drainer for coal gasifier furnace used to produce gas from coal with gasifier and melt ash content has heater incorporated in molten slag drain zone formed in the furnace. Zone is located at lower part of furnace and may have slag hole which is defined by refractory wall.

USE - Useful for coal gasifier.

CHOSEN-DRAWING: Dwg.0/2

TITLE-TERMS: SLAG DRAIN COAL GASIFICATION FURNACE HEATER INCORPORATE MOLTEN SLAG DRAIN ZONE FURNACE

DERWENT-CLASS: H09

CPI-CODES: H09-C;

## SECONDARY-ACC-NO:

CPI Secondary Accession Numbers: C1986-137117

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	MMMC
Drawn Desc	Image										

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⑩ 日本国特許庁(JP)

⑪ 特許出願公開

⑫ 公開特許公報(A) 昭61-235493

⑬ Int.Cl.<sup>4</sup>

識別記号

庁内整理番号

⑭ 公開 昭和61年(1986)10月20日

C 10 J 3/46

7433-4H

審査請求 未請求 発明の数 1 (全3頁)

⑮ 発明の名称 ガス化炉のスラグ排出装置

⑯ 特 願 昭60-75353

⑰ 出 願 昭60(1985)4月11日

⑱ 発 明 者 羽 田 壽 夫 東京都千代田区丸の内2丁目5番1号 三菱重工業株式会社内

⑲ 発 明 者 柏 崎 正 道 東京都千代田区丸の内2丁目5番1号 三菱重工業株式会社内

⑳ 発 明 者 古 閑 義 孝 東京都千代田区丸の内2丁目5番1号 三菱重工業株式会社内

㉑ 出 願 人 三菱重工業株式会社 東京都千代田区丸の内2丁目5番1号

㉒ 復代理人 弁理士 内 田 明 外1名

PTO 2003-510

S.T.I.C. Translations Branch

明 細 書

1. 発明の名称

ガス化炉のスラグ排出装置

2. 特許請求の範囲

炉内に石炭およびガス化剤を投入して、ガス化ガスを生成し、灰分は高温雰囲気中にて溶融させ、炉外に排出させる噴流床方式石炭ガス化炉において、溶融スラグ排出部にヒータを組み込んだことを特徴とするガス化炉のスラグ排出装置。

3. 発明の詳細な説明

(産業上の利用分野)

本発明はガス化炉におけるスラグの排出装置に関し、特に噴流床方式石炭ガス化炉における溶融石炭灰のスラグを安全かつ連続して排出しうる装置に関する。

(従来の技術)

従来、石炭ガス化炉のスラグ排出において、スラグ排出口がスラグにより密閉された際に、溶融スラグため内部のガスをポンプ等で抜くこ

とにより、炉内の圧力の方を高めて、圧力差によりスラグを強制的に排出せんとする方法(特開昭59~145289号公報)があるが、次のような重大な欠点を有する。

(a) 炉内の高温ガスが突出的に流れ出しガス抜き系統を焼損せしめる恐れがある。

(b) スラグ除去時の内圧の変化が激しくなり、安定した運転が行えなくなる恐れがある。

又、スラグ排出口がスラグにより密閉されないように炉内の高温ガスの一部を分岐して、スラグホール部を逆流させて排出することにより、スラグが過度に冷却されることを防止する方法(特開昭58~29887号公報)があるが次のような欠点を有する。

(a) 一部のガスを連続的にぬき出すため、ガス化性能が低下する。

(b) ぬき出したガスの処理が困難である。

(c) 炉内の高温ガスが流れるのでガス抜き系の焼損の恐れがある。

(発明が解決しようとする問題点)

本発明は、ガス化炉、特に噴流床方式石炭ガス化炉における熔融石炭灰スラグを安定して連続的に排出しうることができ、かつガス化炉の運転状態及び性能に悪影響を及ぼさずにスラグを排出することができるガス化炉のスラグ排出装置を提供しようとするものである。

(問題点を解決するための手段)

本発明は、スラグホールの絞り部分に施工された耐火断熱材中にヒータを組み込み、間欠的もしくは連続的に加熱することにより当該部分のスラグの冷却固化を防止するようにした点を特徴とするものであつて、本発明は炉内に石炭およびガス化剤を投入して、ガス化ガスを生成し、灰分は高温雰囲気中にて熔融させ、炉外に排出させる噴流床方式石炭ガス化炉において、熔融スラグ排出部にヒータを組み込んだことを特徴とするガス化炉のスラグ排出装置である。

本発明装置は、噴流床方式ガス化炉ばかりでなく、スラグタップボイラにも有利に適用することができる。

効果的に行わせる。炉1の下方にはスラグホール12が設けられ、このスラグホール12は下方への熱の放出を最小にするためにできるだけ小さく設計されている。

スラグホール12部の外側は水冷壁入口管寄15から分岐した水冷壁2にて囲まれ、耐火材11および耐火断熱材13が施工されるとともに、ヒータ14が耐火断熱材の中に組込まれる。ヒータ14の形式は電気式、高温蒸気式あるいは高温ガス加熱式など、いずれの形式のもでもよい。

上記した本発明のガス化炉のスラグ排出装置は、(1)ガス化炉の運転状態およびガス化性能に何ら悪影響を及ぼさずにスラグの冷却固化を防止することが可能であり、(2)スラグホールを極力小さく測定し、下方への放散熱を軽減させているのでガス化性能向上に寄与することができるという効果を奏するものである。

#### 4. 図面の簡単な説明

第1図は、本発明のガス化炉全体構成を示す

以下、本発明装置の一実施態様を、第1図及び第2図に示す。第1図はガス化炉の全体構成を、また第2図はスラグホール部の拡大状況を示す。

(構成)

ガス化炉1は周囲を水冷壁2により囲まれており、炉の下方には石炭、4p-3およびガス化剤4(空気または酸素富化空気または酸素など)が投入されて高温状態となり、灰分は熔融スラグ5となつて下方の灰ホッパ6に流下する。灰ホッパ6には冷却水7が供給され、流下した熔融スラグ5は水により急冷され、水砕スラグ8として外部に排出される。

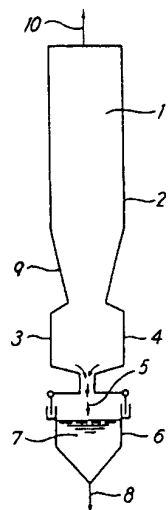
一方、炉内の高温を利用して若干上部の位置から投入された石炭9のガス化が行われる。生成ガス10は炉外に導かれ、脱じん・脱硫設備に送られる。

ガス化炉1の水冷壁2の水冷管2'の内部には第2図に示すように耐火材11が施工され、水鋼へ伝わる熱を最小にとどめながら、ガス化を

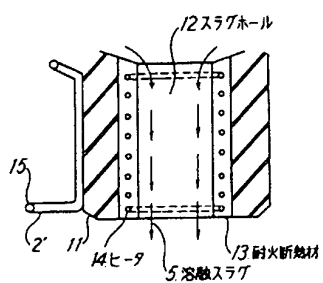
概略図、第2図はスラグホール部の拡大状況を示す概略図である。

復代理人 内 田 明  
復代理人 森 原 亮 一

第 1 図



第 2 図



**PTO: 2003-510**

**Japanese Published Unexamined (Kokai) Patent Application No. S61-235493, published October 20, 1986; Application No. S60-75353, filed April 11, 1985; Int. Cl.<sup>4</sup>: C10J 3/46; Inventor(s): Toshio Haneda et al.; Assignee: Mitsubishi Heavy Industries Corporation; Japanese Title: Gasukaro no Suragu Haishutsu Souchi (Slag Discharger for a Gasification Oven)**

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**Specification**

**1. Title of Invention**

**Slag Discharger for a Gasification Oven**

**2. Claim**

**A slag discharger for a gasification oven which is an entrained flow coal gasification oven type wherein a gasified gas is generated by supplying coal and a gasifying agent into the oven and wherein an ash portion is discharged to a point outside the oven after it as been fused in a high temperature atmosphere, characterized in that a heater is incorporated into the fused slag discharge unit.**

**3. Detailed Description of the Invention**

**[Field of Industrial Application]**

**This invention pertains to slag dischargers for gasification ovens. In particular, this invention relates to devices that safely and continuously discharge slag of fused coal ash generated in entrained flow coal gasification ovens.**



**[Prior Art]**

As for a slag discharge from coal gasification ovens, there is a method to forcibly discharge slag due to a pressure difference by increasing the pressure inside the ovens by removing gases inside fused slag collectors when slag discharge outlets are sealed by slag (Japanese unexamined patent application No. S59-145289). However, the following critical disadvantages occur:

- (a) High temperature gases inside the ovens burst out and burn out the gas removing systems;
- (b) The change of the inner pressure during a slag removal increases, and a stable operation may not be possible;

In addition to the aforementioned method, there is a method to prevent an excess cooling of slag by removing a portion of high temperature gases inside the oven by creating a reverse flow at the slag hole sections by separating it so that the slag discharge outlets do not clog (Japanese unexamined patent application No. 58-29887). However, the following disadvantages occur:

- (a) The gas performance deteriorates due to a continuous removal of a portion of gases;
- (b) It is difficult for the removed gases to be treated;
- [c] The gas removing systems may burn out because of a flowing of high temperature gases inside the ovens.

**[Problem of Prior Art to Be Addressed]**

The invention offers a slag discharger for a gasification oven that is capable of

continuously and stably discharging fused coal ash slag generated in a gasification slag, particularly an entrained flow coal gasification oven and discharging the slag without giving any negative effect on the operational state and the performance of the gasification oven.

The invention is characterized in that a solidification of the slag at the aforementioned section by a cooling means is prepared by incorporation a heater into a fire retardant heat insulator which is installed into a throttled section of the slag hole and then by intermittently or continuously heating the slag. The invention is a slag discharger for a gasification oven which is an entrained flow coal gasification oven type wherein a gasified gas is generated by supplying coal and a gasifying agent into the oven and wherein an ash portion is discharged to a point outside the oven after it as been fused in a high temperature atmosphere, characterized in that a heater is incorporated into the fused slag discharge unit.

The device of the invention can be also effectively used for a slag tap boiler as well as the entrained flow coal gasification oven.

An embodiment of the device of the invention is described hereinbelow in Fig.1 and Fig.2. Fig.1 is a schematic diagram of gasification oven. Fig.2 illustrates an enlarged slag hole.

#### **[Constitution]**

A gasification oven 1 is surrounded by a water cooling wall 2. A high temperature state is created by supplying the following substances to the lower part of the oven: coal; 4p-3; a gasification agent 4 (air, oxygen enriched air or oxygen). The ash portion flows down to an ash hopper 6 at the lower part in the form of slag 5. Cooling water 7 is supplied to ash hopper 6. Fused slag 5 flowed down is quickly cooled by water. The cooled slag is then discharged to a

point outside as water pulverized slag 8.

On the other hand, coal 9 supplied from a location at a slightly upper section is gasified using the high temperature inside the oven. A generated gas 10 is transferred to a point outside the oven and then dust removing and desulfurizing equipment.

As shown in Fig.2, a fire retardant material 11 is installed to the interior of a water cooling pipe 2' of water cooling wall 2 of gasification oven 1. With the fire retardant material, while the heat transmitted to the water side is kept at a minimum level, the gasification is effectively performed. A slag hole 12 is provided at the lower part of oven 1, which is designed to be as small as possible so as to minimize the discharge of the heat to the lower part.

The exterior of slag hole 12 is surrounded by water cooling wall 2 separated from a water cooling wall inlet pipe 15. Fire retardant material 11 and fire retardant heat insulator 13 are installed. A heater 14 is incorporated into the fire retardant heat insulator. Heater 14 takes any type such as an electric type, a high temperature steam type or a high temperature gas heating type.

The gasification oven of the invention as described above demonstrates the following advantages:

- (1) Prevention of the solidification of the slag by a cooling means without giving any negative effect on the gasification performance and the operational status of the gasification oven;
- (2) Improved gasification performance due to a reduced radiant heat to the lower part by providing the slag hole as small as possible.

#### **4. Brief Description of the Invention**

**Fig.1 is a schedule diagram illustrating the whole components of a gasification oven of the invention. Fig.2 is a schematic diagram illustrating an enlarged slag hole.**

**Translations Branch  
U.S. Patent and Trademark Office  
11/12/02  
Chisato Morohashi**